NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(ACRE)

No. 590

DEFINITION

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

PURPOSES

- To budget and supply nutrients for plant production.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To minimize agricultural non-point source pollution of surface and ground water resources.
- To maintain or improve the physical, chemical and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied.

CRITERIA

General Criteria Applicable to All Purposes

Plans for nutrient management shall comply with all applicable Federal, state and local laws and regulations.

Persons who review or approve plans for nutrient management shall be certified by the West Virginia Department of Agriculture's certification program.

A nutrient budget for nitrogen, phosphorus, and potassium shall be developed that considers all potential sources of nutrients (animal manure, organic by-products, waste water, commercial fertilizer, crop residues, legume credits. Use Nutrient Budget Worksheet in Appendix 1 or equivalent.

Realistic yield goals shall be used based on soil productivity information, historical yield data, and/or level of management. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.

Plans for nutrient management shall specify the form, source, amount, timing and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and/or phosphorus movement to surface and/or ground waters.

Erosion and runoff control practices shall be installed on fields that receive nutrients to reduce potential nutrient losses to acceptable levels. Soil loss will be reduced to tolerable (T) level.

Soil Sampling and Laboratory Analysis (Testing)

Nutrient planning shall be based on current West Virginia University (WVU) soil test results. Current soil tests are those that are no older than five years.

Soil samples shall be collected and prepared according to WVU guidance. (Appendix 2)

Plant Tissue Testing

Tissue sampling and testing, where used, shall be done in accordance with WVU recommendations.

Criteria Applicable to Nutrient Application Rates for Inorganic Fertilizers

If litter, manure or other organic by-products are a source of nutrients, follow the section in the standard titled Nutrient Application Rate for Organic Fertilizer.

Recommended soil amendments and nutrient application rates shall be based on WVU soil test for pH, P_2O_5 and K_2O. Nitrogen application is based upon realistic yield goal.

- **Nitrogen Application –** Planned nitrogen application rates shall account for the residual amount of nitrogen in the soil and crop residue. Use FOTG Reference The Agronomy Guide – Typical Crop Nutrient Removal (Table 2-8) to determine nitrogen recommendation based upon a realistic yield.
- **Potassium Application –** On permanent pasture, soils that test high or very high in potassium (>120lbs of K) additional potassium should not be applied in order to minimize potential for grass tetany.
- **Other Plant Nutrients –** The planned rates of application of other nutrients shall be consistent with WVU.
- **Starter Fertilizers –** Starter fertilizers containing nitrogen, phosphorus and potassium may be applied in accordance with WVU recommendations. When starter fertilizers are used, they shall be included in the nutrient budget.

Nutrient Application Timing/Methods

Timing and method of nutrient application shall correspond as closely as possible with the crop, nutrient uptake characteristics. Use The Agronomy Guide to identify timing of nutrient application for specific crop establishment and/or maintenance.

Nutrients shall not be applied to frozen, snow-covered, or saturated soil.

Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source

Nutrient values of manure and organic by-products (excluding sewage sludge) shall be determined prior to land application based on laboratory analysis. Book values recognized by the NRCS and/or WVU, or historic records for the operation may be used to develop an initial plan.

Nutrient Application Rates for Organic Fertilizers

The planned rates of nitrogen and phosphorus application recorded in the plan shall be determined based on the following guidance:

- **Statewide –** Manure or litter may be applied at the nitrogen based application rate to meet crop nitrogen removal rate

based on estimated crop removal rate or Pre-Sidedress Nitrogen Test (PSNT).

If the current soil test indicates the soil phosphorus level is less than 80lbs/ac, manure or litter may be applied at the crops estimated phosphorus removal in harvested bio-mass for a maximum period of 3 years. When such application is made the nitrogen application rate will not exceed crop needs during the year of manure/litter application.

If excess litter, manure or organic by-products is generated on the farm the plan will identify the quantity, and the planned use of the excess.

Application equipment will be calibrated to insure accuracy and uniformity of manure or litter application and documented on Manure Spreader Calibration form in Appendix 3.

Phosphorus Field Risk Assessment (Potomac Valley SCD)

When animal manures or other organic by-products are applied, a field-specific assessment of the potential for phosphorus transport from the field shall be completed. This assessment will be done using the Phosphorus Index. (Appendix 4)

For fields with high or very high potential losses, appropriate conservation practices identified in the Phosphorus Index must be installed to reduce the vulnerability to off-site phosphorus transport.

A record of the assessment rating for each field or sub-field, and information about conservation practices and management activities that can reduce the potential for phosphorus movement from the site, will be included in the plan.

When such assessments are done, the results of the assessment and recommendations shall be discussed with the producer during the development of the plan.

In situations where the plan is being implemented on a phosphorus standard, and additional application of inorganic nitrogen may be required, N application will be based upon PSNT or estimated crop needs.

Nitrogen Field Risk Assessment

In areas with an identified or designated nitrogen-related water quality impairment, and assessment shall be completed of the potential for nitrogen using the Leaching Index (Appendix 5). The results of these assessments and recommendations shall be discussed with the producer and included in the plan.

Plans developed to minimize agricultural non-point source pollution of surface or ground water resources shall include practices and/or management activities that can reduce the risk of nitrogen movement from the field.

Heavy Metals Monitoring

When sewage sludge is applied, the accumulation of potential pollutants (including arsenic, cadmium, copper, lead, mercury, selenium, and zinc) in the soil shall be monitored by the owner/client in accordance with the US Code, Reference 40 CFR, Parts 403 and 503, and/or any applicable state and local laws or regulations.

CONSIDERATIONS

Consider induced deficiencies of nutrients due to excessive levels of other nutrients.

Consider additional practices to improve soil nutrient and water storage, infiltration, aeration, tilth, diversity of soil organisms and to protect or improve water quality.

Consider cover crops and their harvest whenever possible to utilize and reduce residual nitrogen.

Consider application methods and timing that further reduce the risk of nutrients being transported to ground and surface waters, or into the atmosphere. Suggestions include:

- split applications of nitrogen to provide nutrients at the times of maximum crop utilization,
- avoiding fall or winter nutrient application for spring seeded crops,
- band applications of phosphorus near the seed row,
- applying nutrient materials uniformly to application areas,
- immediate (1-3 days) incorporation of land applied manures or organic by-products,
- delaying field application of animal manures or other organic by-products if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Consider 35 feet or wider setback distances from environmentally sensitive areas, such as sinkholes, wells, gullies, ditches, surface inlets or rapidly permeable soil areas.

Consider the potential problems from odors associated with the land application of animal manures, especially when applied near or upwind of residences.

Consider nitrogen volatilization losses associated with the land application of animal manures. Volatilization losses can become significant, if manure is not immediately incorporated into the soil after application.

Consider the potential to affect National Register listed or eligible cultural resources.

Consider using soil test and manure or litter analysis information no older than one year when developing new plans, particularly if animal manures are to be a nutrient source.

Consider annual reviews to determine if changes in the nutrient budget are desirable (or needed) for the next planned crop.

On sites on which there are special environmental concerns, consider other sampling techniques. (For example: Pre-Sidedress Nitrogen Test (PSNT), or soil surface sampling for phosphorus accumulation or pH changes.)

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize water quality impairment.

The following components shall be included in the nutrient management plan:

- aerial photograph or map and a soil map of the site,
- current and/or planned plant production sequence or crop rotation,
- results of soil, plant, water, manure or organic by-product sample analyses,
- realistic yield goals for the crops in the rotation,
- quantification of nutrient sources for N, P and K,

- recommended nutrient rates, timing, form, and method of application and incorporation,
- location of designated sensitive areas or resources and the associated nutrient management restriction,
- guidance for implementation, operation, maintenance, and recordkeeping,
- complete nutrient budget for nitrogen, phosphorus, and potassium for the rotation or crop sequence.
- manure or litter spreader rate calibrations and the desired application rate,
- conservation practices required, location and practice narrative to reduce the vulnerability of off-site phosphorus transport, based on the phosphorus index,
- a statement that the plan was developed based on the requirements of the current standard and any applicable Federal, state or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan.

OPERATION AND MAINTENANCE

The owner/client is responsible for safe operation and maintenance of this practice including all equipment. Operation and maintenance addresses the following:

- periodic (5yrs max.) plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed and revised with each soil test cycle.
- protection of fertilizer and organic by-product storage facilities from weather and accidental leakage or spillage.
- calibration of new application equipment to ensure uniform distribution of material at planned rates.
- Maintaining records of document plan implementation. Records include:
  - soil test results and recommendations for nutrient application,
  - quantities, analyses and sources of nutrients applied,
  - dates and method of nutrient applications,
  - crops planted, planting and harvest dates, yields, and crop residues removed,
  - application rate of nutrients,
  - results of water, plant, and organic by-product heavy metal analyses (if applicable),
  - dates of review and person performing the review, and recommendations that resulted from the review.

Records should be maintained for a minimum of five years or longer if required by other Federal, state, or local ordinances, or program or contract requirements.

Workers should be protected from and avoid unnecessary contact with chemical fertilizers, organic by-products or poultry litter. Protection should include the use of protective clothing. Extra caution must be taken when handling ammonia sources of nutrients, or when dealing with organic wastes stored in unventilated enclosures.

The disposal of material generated by the cleaning nutrient application equipment should be accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on

areas of high potential risk for runoff and/or leaching.

The disposal or recycling of nutrient containers should be done according to state and local guidelines or regulations.